



*International*  
OBSERVE THE  
**MOON**  
**NIGHT**  
**2016**

*October*

SAVE THE DATE

8<sup>TH</sup>



#observethemoon

[OBSERVETHEMOONNIGHT.ORG](http://OBSERVETHEMOONNIGHT.ORG)

Planets, Moons and Meteorites, Oh My!

# Who We Are: Ask a Scientist!



**Heliophysics & Planetary  
Science Office**

Barbara Cohen, Lunar and Planetary Scientist

Renee Weber, Lunar and Planetary Scientist

Mitzi Adams, Solar Physicist

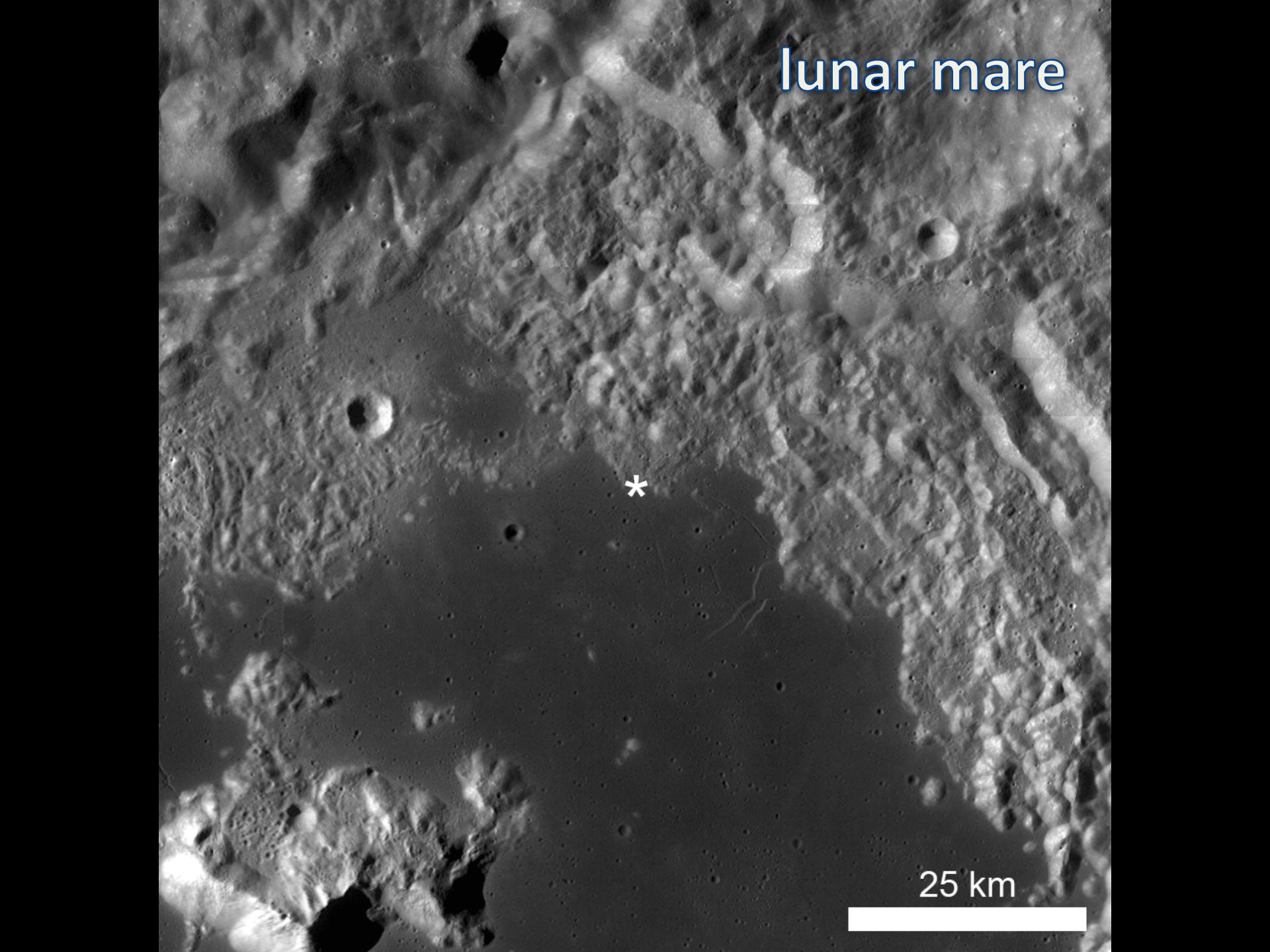


Marshall Space  
Flight Center

**Meteoroid Environment Office**

Bill Cooke, Program Manager

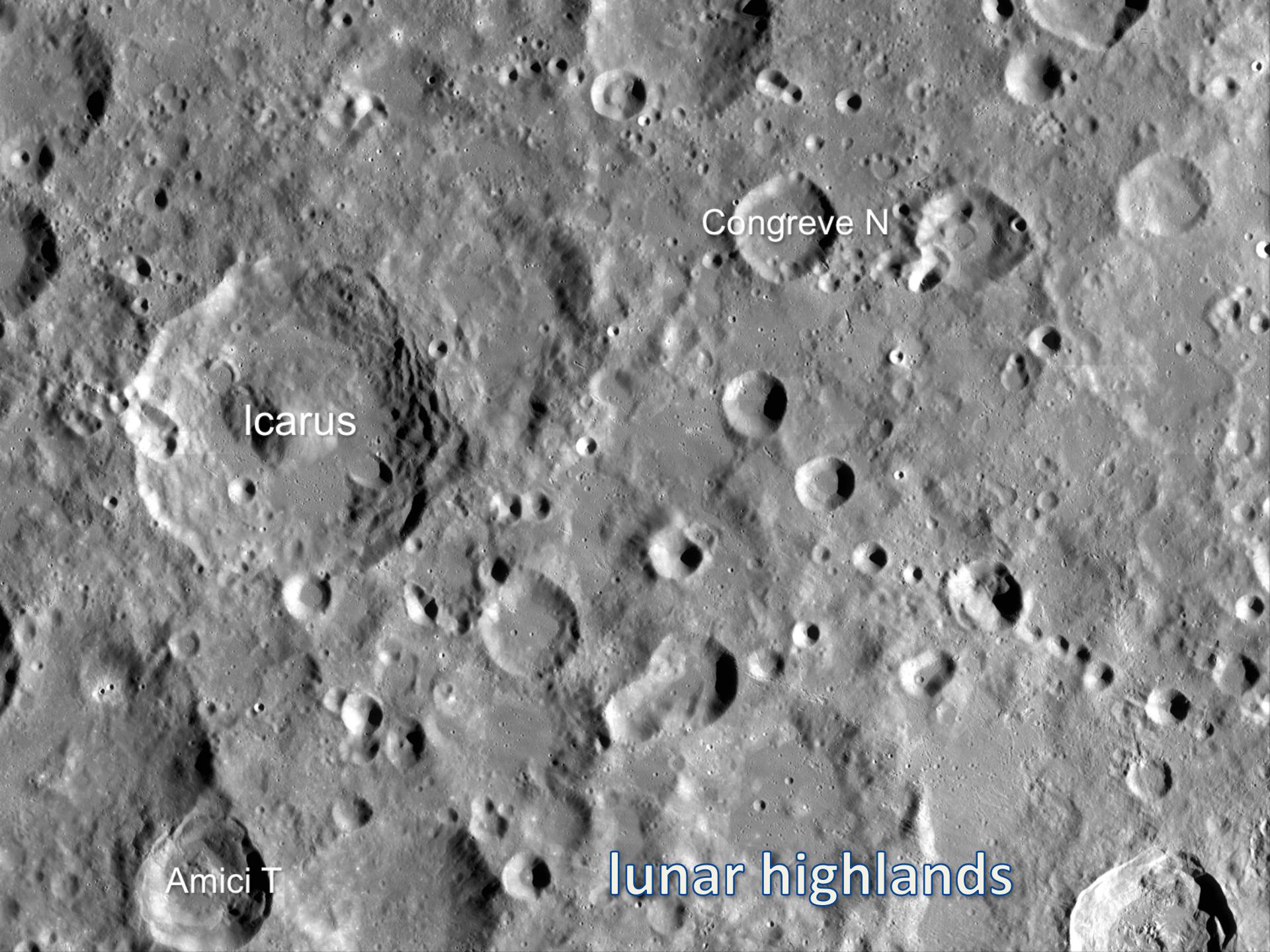




lunar mare

\*

25 km

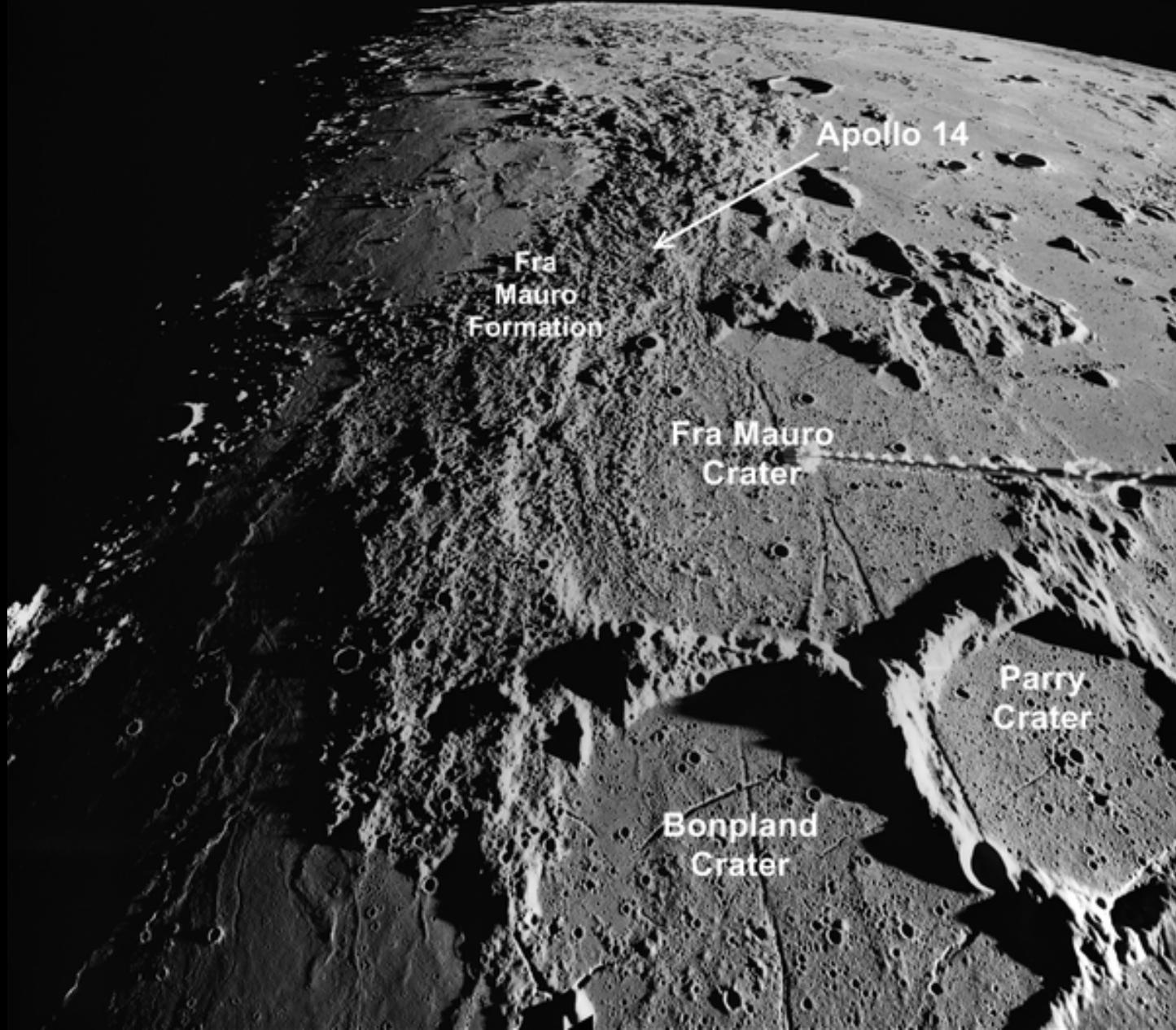


Congreve N

Icarus

Amici T

lunar highlands



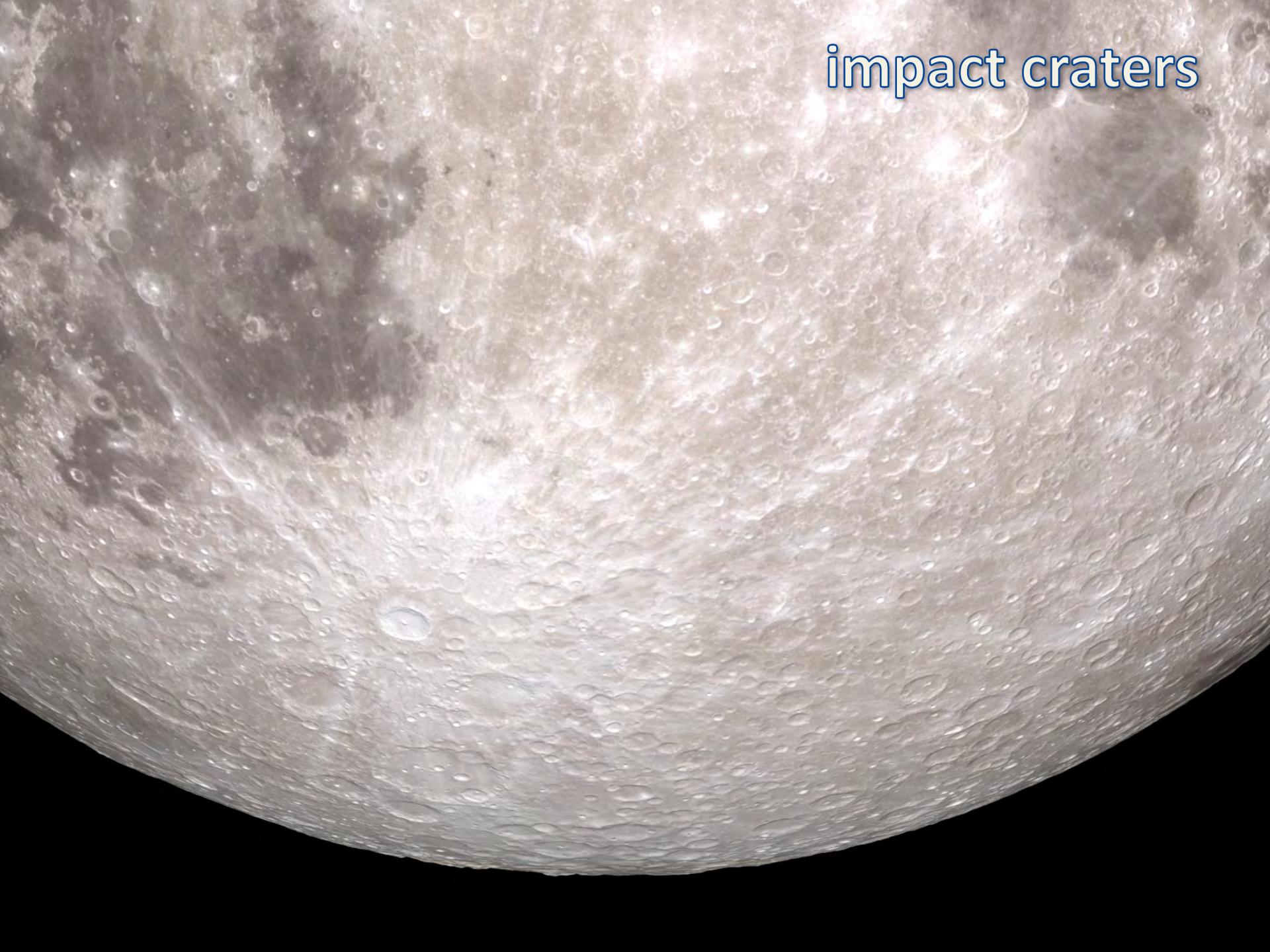
Fra  
Mauro  
Formation

Fra Mauro  
Crater

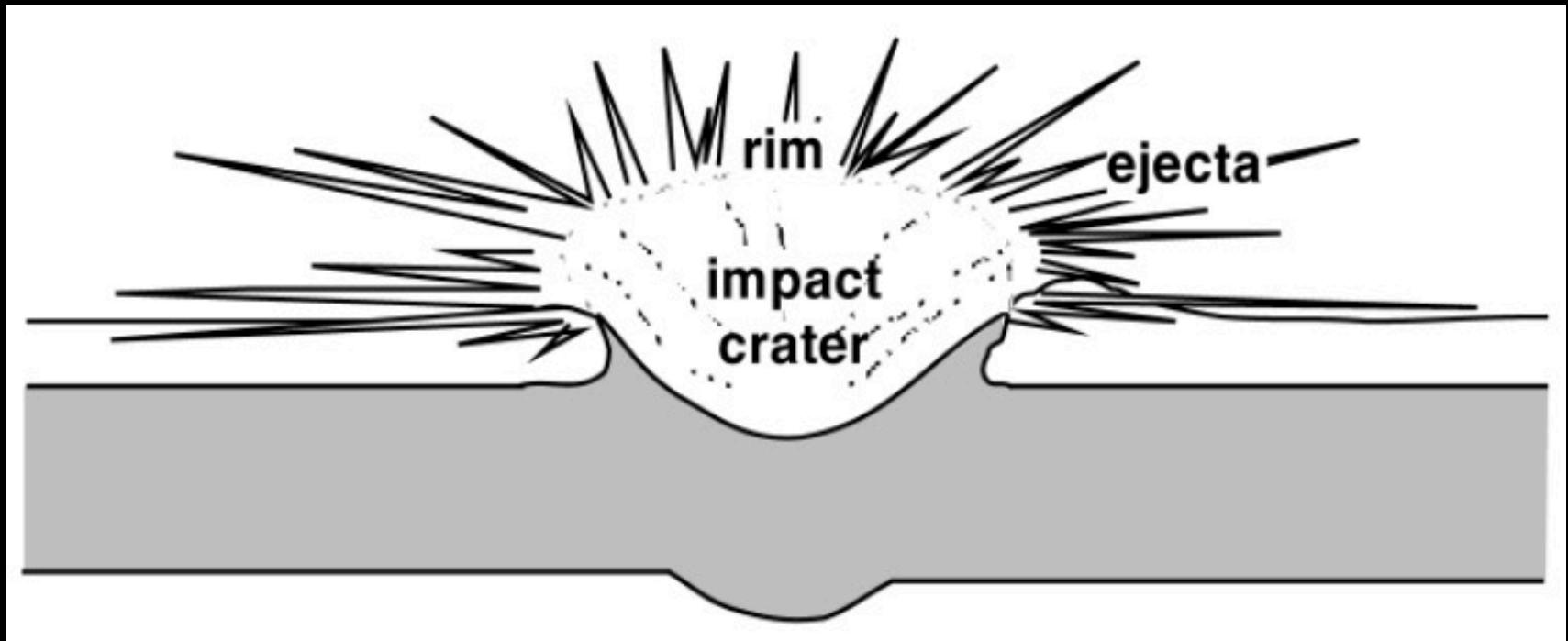
Parry  
Crater

Bonpland  
Crater

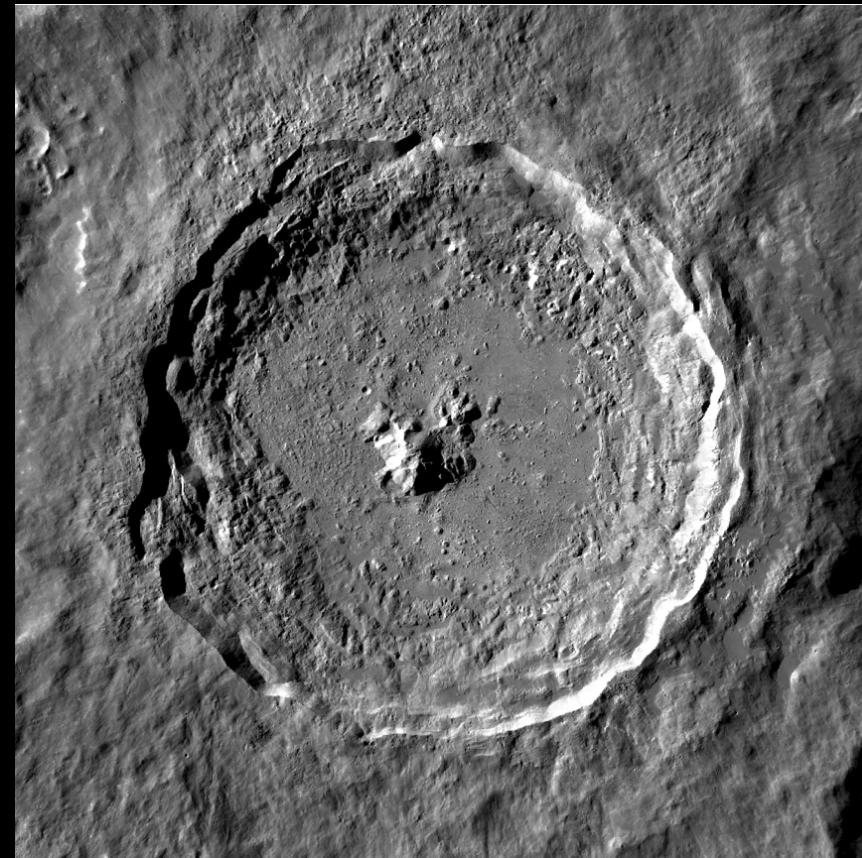
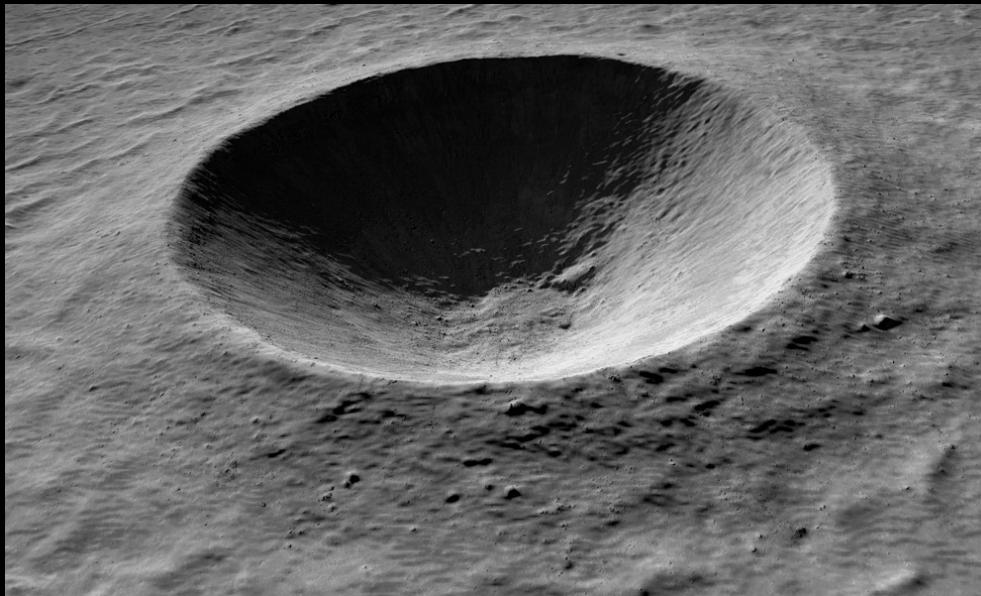
Apollo 14



impact craters

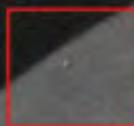


crater formation and ejecta patterns

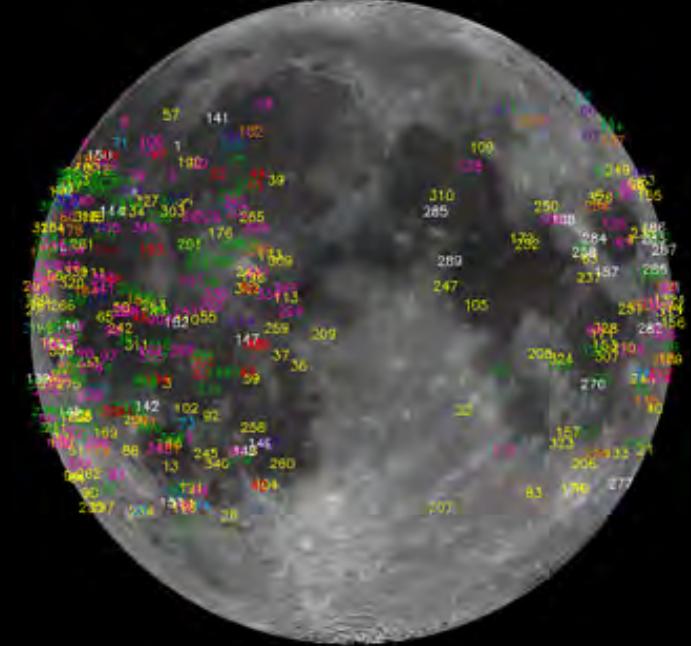


crater types

11.17.2006



2005–2016 MEO Impact Candidates



# The Great American Solar Eclipse

August 21, 2017

National Aeronautics and  
Space Administration



After the 2017 solar eclipse, the next total solar eclipse visible over the continental United States will be on April 8, 2024.

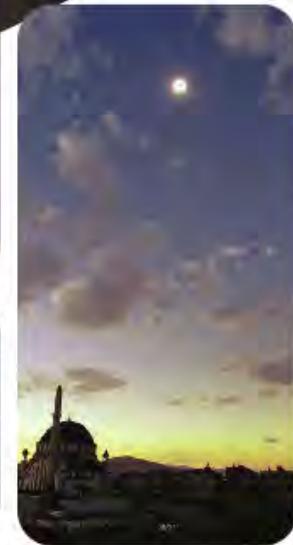
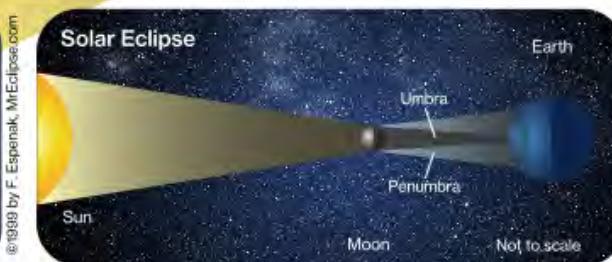
The last total solar eclipse to cover this much of the country was on June 8, 1918.

If the Sun is scaled to about 10 cm (3.9 in), Earth would be about 10 meters away (33 feet).

## What is a Solar Eclipse?

A solar eclipse happens when the Moon, as it orbits Earth, fully or partially blocks the light of the Sun, thus **casting its shadow on Earth**.

Observers within the *path of totality* can expect to see something like the image below. Observers outside the path of totality will see the Sun partially eclipsed as a crescent Sun (with safe filters).



©1999. Photos by F. Espenak, MrEclipse.com.

## The predicted path of the August 21, 2017 solar eclipse

Duration of Greatest Eclipse:

2 min 40 sec

(18:25 UT=13:25 CDT or 1:25 p.m. CDT)

Location of Greatest Eclipse:

36 deg 58 min N; 87 deg 40 min W  
(between Princeton, KY and Hopkinsville, KY)

Path Width: approximately 115 km

Eclipse predictions by Fred Espenak, GSFC, NASA Emeritus



http://mail.colonial.net/~hkaifer/Index.htm

**Never look directly at the Sun unless you have filters that you know are safe.**

For more information:

For more information about solar eclipses:

[www.nasa.gov](http://www.nasa.gov)

<http://eclipse/gsfc.nasa.gov/SEhelp/safety.html>  
<http://eclipse.gsfc.nasa.gov/solar.html>  
<http://eclipsewise.com/solar>  
<http://eclipse2017.org/>

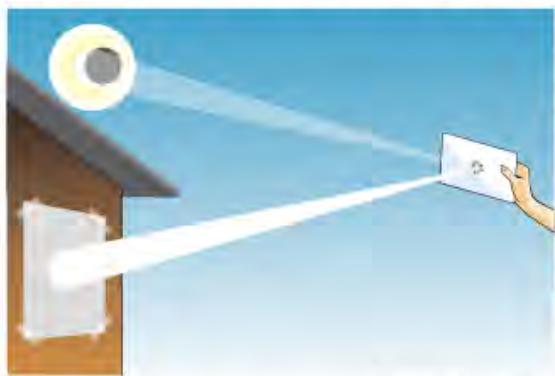
The NASA image above shows the Moon's **umbral shadow** as seen from the International Space Station during the total solar eclipse on 29 March 2006.

Mitzi Adams • [mitzi.adams@nasa.gov](mailto:mitzi.adams@nasa.gov) • 256-961-7626

FL-2016-06-52-MSFC G-157953

# Safely Observing the Sun

**WARNING:** Never look directly at the Sun without proper eye protection. You can seriously injure your eyes.



## Mirror in an Envelope

Slide a mirror into an envelope with a ragged hole cut into the front. Point the mirror toward the Sun so that an image is reflected onto a screen at least 5 meters (about 15 feet) away. The longer the distance, the larger the image. **Do not look at the mirror, only at the screen.**

Photograph (below) Copyright © Elisa J. Israel



## Strange Shadows!

Sunlight through trees produces projected crescents during partial phases.

## Go Stick Your Head in a Box

You can make this simple "eclipse telescope" with some cardboard, paper, tape, and foil.

The longer the distance from the pinhole to screen, the larger the image of the Sun will be.

White paper screen taped to inside end of box

Small image of partially eclipsed Sun



Location	% Covered	Start (CDT)	Max (CDT)	End (CDT)
Nashville, TN	100.0%	11:58AM	1:28PM	2:54PM
		Totality begins 1:27PM • Totality ends 1:29PM		
Brentwood, TN	100.0%	11:58AM	1:28PM	2:54PM
		Totality begins 1:28PM • Totality ends 1:29PM		
Franklin, TN	99.9	11:58AM	1:28PM	2:54PM
Fayetteville, TN	98.2	11:59	1:30	2:56
Ardmore, AL/TN	97.3	11:59	1:29	2:55
Florence, AL	95.9	11:57	1:28	2:54
Athens, AL	96.7	11:59	1:29	2:56
Decatur, AL	96.1	11:59	1:30	2:56
Hartselle, AL	95.8	11:59	1:30	2:56
Madison, AL	96.7	11:59	1:30	2:56
USSRC	96.8	11:59	1:30	2:56
Huntsville, AL	97.0	11:59	1:30	2:56
VBAS	97.1	12:00PM	1:30	2:56
Arab, AL	96.0	12:00	1:31	2:57
Gurley, AL	97.1	12:00	1:31	2:57
Guntersville, AL	96.4	12:01	1:31	2:57
Scottsboro, AL	97.4	12:01	1:31	2:57
Bridgeport, AL	98.6	12:01	1:32	2:57



## Sun Funnel

Make this device for your telescope with simple instructions at: [www.astrosociety.org/tov/Build\\_a\\_Sun\\_Funnel.pdf](http://www.astrosociety.org/tov/Build_a_Sun_Funnel.pdf)

## Cool in the Shades

Visit the Von Braun Astronomical Society (or your local astronomical society) and pick up a pair of these special Eclipse Sunglasses!

[www.vbas.org](http://www.vbas.org)

The Great American Eclipse  
August 21, 2017  
VBAS  
Von Braun  
Astronomical  
Society  
www.vbas.org

All images used with permission.



## Moon Phases 2016

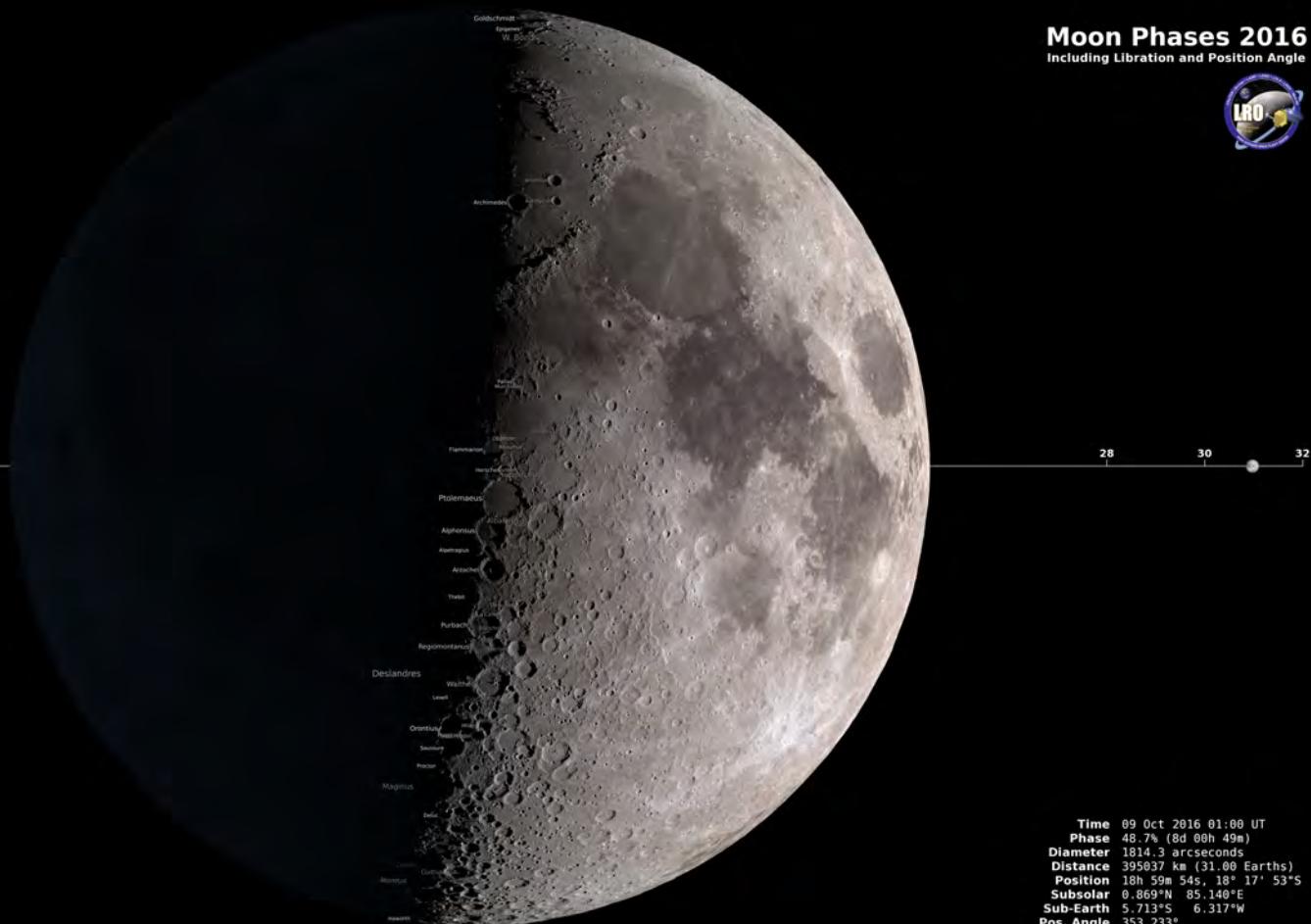
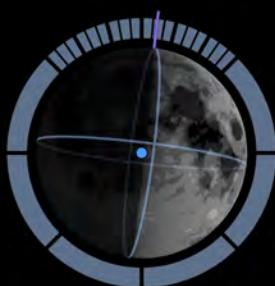
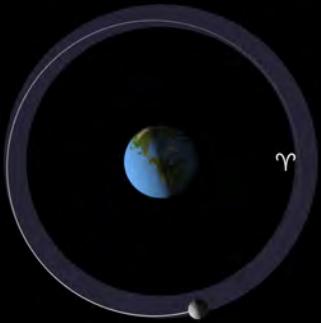
Including Libration and Position Angle



28 30 32

**Time** 01 Jan 2016 00:00 UT  
**Phase** 61.6% (28d 13h 31m)  
**Diameter** 1779.5 arcseconds  
**Distance** 402771 km (31.61 Earths)  
**Position** 11h 47m 28s, 01° 32' 56"N  
**Subsolar** 1.502°N 74.460°W  
**Sub-Earth** 0.205°S 2.095°E  
**Pos. Angle** 24.955°

Phases of the Moon



what you'll see tonight